

H.P.

Notice of Allowability

Application No.

10/720,738

Applicant(s)

SUGI ET AL.

Examiner

Art Unit

Steven H. Rao

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 3/16/05.
2. ☒ The allowed claim(s) is/are 1,3-8,13-15,17,21 and 23-29.
3. ☒ The drawings filed on 16 March 2005 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

Response to Amendment

Applicants' amendment filed by fax on March 11, 2005 has been entered on March 16, 2005.

Therefore claims 1,3-8,13-15,17,21 and 23 as amended by the amendment and claims 24-29 presently newly added are currently pending in the Application.

Claims 2,9-12,16,18-20 and 22 have been cancelled.

Allowable Subject Matter

Claims 1,3-8,13-15,17, 21 and 23-29 are allowed.

The following is an examiner's statement of reasons for allowance:

The prior art taken either singularly or in combination fails to anticipate or fairly suggest the limitation of the dependent claims, in such manner that a rejection under 35 U.S.C. 102 or 103 would be proper. The applied prior art fails to teach a combination of all the claimed features as presented in independent claims, which include a semiconductor device as claimed in independent claims 1, 23 and 24 including the recitation of the width of the second /third trench sections is smaller than the width of the first trench section and the mesh pattern being formed by connecting trench sections having different widths, and further for claim 8 a semiconductor substrate a trench formed in le-substrate, at least one non-trench region surrounded by the trench an active region formed on the substrate over the trench for-driving current as a first diffusion region formed at a bottom of the trench In the active region'. And a second diffusion region formed in the non-trench region wherein current is flowable between the first diffusion region and me-second diffusion semiconductor element and further

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wherein the trench comprises a first trench section formed in the active region and a second trench section-intersecting the first trench section to form a mesh pattern surrounding the non-trench region wherein the first diffusion region is formed at the bottom of--ht e first trench section and wherein the semiconductor device is a trench lateral transistor composed of at least the semiconductor substrate, the first and second diffusion regions, the first diffusion region driving current as a transistor, a gate insulator film formed inside the trench, a first conductor formed inside the gate insulator film a second conductor formed inside the first conductor in the active region with an interlayer insulator film interposed there between and electrically connected to the first diffusion region, a first electrode penetrating through the interlayer insulator film electrically connected to the second diffusion region, and a second electrode penetrating through the interlayer insulator film to electrically connect to the second conductor.-

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Rao whose telephone number is (571) 272-1718 . The examiner can normally be reached on 8.00 to 5.00.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Steven H. Rao

Patent Examiner

5/25/05



LONG PHAM
MARY EXAMINER